

## **Title: The Sum of Our Integer Intelligences**

### **Brief Overview:**

The students will be able to explore addition of integers through seven learning stations based on the seven intelligences identified by Dr. Howard Gardener. Each station contains a performance task or tasks and scoring key or rubric.

### **Link to Standards:**

- **Problem Solving** Students will demonstrate their ability to solve problems in mathematics using various strategies including problems with open-ended answers, and problems which are solved in a cooperative atmosphere.
- **Communication** Students will demonstrate their ability to communicate mathematically. They will write and discuss mathematics in seven different ways based on Howard Gardener's seven intelligences.
- **Reasoning** Students will demonstrate their ability to reason mathematically. They will make conjectures and build evidence to support a decision.
- **Connections** Students will demonstrate their ability to connect mathematics topics within the discipline and with other disciplines.
- **Number & Number Relationships** Students will demonstrate their ability to solve problems using addition of integers to determine if a solution is sensible, to understand the meaning of the operations, to represent relationships on a two-dimensional graph.
- **Algebra** Students will demonstrate their ability to perform algebraic operations and will be able to model algebraic concepts using concrete materials to solve simple equations.
- **Statistics** Students will demonstrate their ability to collect and organize data.
- **Geometry** Students will demonstrate their ability to apply geometric relationships using one, two and three dimensional objects.

### **Grade/Level:**

7 or 8

**Duration/Length:** Each of the seven stations requires 20 - 25 minutes.

### **Prerequisite Knowledge:**

Students should have working knowledge of the following skills:

- Rules for addition of integers
- Plotting an ordered pair on a coordinate axis
- Estimation skills

## **Objectives:**

Students will:

- apply rules for addition of integers.
- work cooperatively in groups.
- graph ordered pairs on a coordinate plane.
- commutate knowledge of rules for addition of integers through writing.

## **Materials/Resources/Printed Materials:**

- Seven intelligence stations
- Pencils
- Paper
- Transparency of Howard Gardener's seven intelligences
- Scissors
- Tape
- See individual stations for additional supplies

## **Development/Procedures:**

- Set up seven intelligence stations around classroom
  1. Logical / Mathematical - Albert Einstein
  2. Verbal / Linguistic - William Shakespeare
  3. Body / Kinesthetic - Indiana Jones
  4. Visual / Spatial - Pablo Picasso
  5. Musical / Rhythmic - Ray Charles
  6. Interpersonal - Mother Teresa
  7. Intrapersonal - Emily Dickinson
- Use overhead transparency to briefly explain Howard Gardener's seven intelligences
- Determine groups (maximum - groups of 4 or 5 students)
- Determine the number of rotations for each station

## **Evaluation:**

Each station is a performance task and contains a scoring key or rubric.

## **Extension/Follow Up:**

The students will complete a Student Evaluation of the seven stations.

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# "7 Ways of Knowing" Multiple Intelligences

1. **Logical / Mathematical Intelligences** - Often called "scientific thinking," this intelligence deals with inductive and deductive thinking / reasoning, numbers and the recognition of abstract patterns.
2. **Verbal / Linguistic** - This intelligence, which is related to words and language - written to spoken - dominates most Western educational systems.
3. **Visual / Spatial** - This intelligence, which relies on the sense of sight and being able to visualize an object, includes the ability to create internal mental images / pictures
4. **Body / Kinesthetic** - This intelligence is related to physical movement and the knowings / wisdom of the body, including the brain's motor cortex, which controls bodily motion.
5. **Musical / Rhythmic** - This intelligence is based on the recognition of tonal patterns, including various environmental sounds, and on a sensitivity to rhythm and beats.
6. **Interpersonal** - This intelligence operates primarily through person-to-person relationships and communication.
7. **Intrapersonal** - This intelligence relates to inner states of being, self-reflection, metacognition (i.e. thinking about thinking) and awareness of spiritual realities.

Adapted from Frames of Mind: The Theory of Multiple Intelligences by Howard Gardner, New York: Basic Books, Inc.

## DIRECTIONS FOR INTEGER SUM BINGO:

Materials:           Bingo Board & Directions  
                  Performance Task Worksheet  
                  2 chips

1. Each player is to choose a number between -10 and 10. Write your number on a slip of paper and fold it. Do not let your partner see your number.
2. Each player is to place one chip on any number in the number bank.
3. Which ever player has chosen a number closest to their opponents number on the number bank goes first.
4. The first player must add the two integers with the chips on them in the number bank.
5. Once the first player has the sum, they must find it on the bingo board and place an X on it.
6. The second player can only move one chip on the number bank. That player then adds the two numbers with chips on them.
7. The second player finds their sum on the bingo board and places a zero on that number.
8. Players continue taking turns, but only moving one chip on the number bank at a time. The first player with five sum in a row WINS!

INTEGER SUM

B	I	N	G	O
-18	-16	-14	-12	-10
-7	-6	-5	-4	-3
-1	1	Free Space	4	5
7	8	10	12	14
-8	3	-2	6	16

Number Bank

-1	2	-3	4	-5	6	-7	8	-9
----	---	----	---	----	---	----	---	----

## PERFORMANCE TASKS WORKSHEET

1. Work with a partner. Play Integer Sum BINGO. (See game board and directions.)

COMPLETE THE REMAINING TASKS ON YOUR OWN.

2. Did you win at BINGO?

3. What was your strategy? Explain.

4. Find the sum of each.

a.  $-4 + -8 =$

b.  $-12 + 6 =$

c.  $17 + -9 =$

d.  $-13 + 13 =$

5. Look at the following problem.

$$26 + -17 + -11 + 17 + -26 =$$

Without computing the sum, give the answer. \_\_\_\_\_

6. Find two temperatures that are 24 degrees apart and one of the numbers is less than zero. \_\_\_\_\_ and \_\_\_\_\_

7. Using "O" for each negative number and "X" for each positive number, draw a picture to represent the sum of negative three.

8. Lynn owes her sister \$12. On Saturday, she got her allowance of \$15. She spent \$8 on snacks at the game. She then gave her sister the rest of her allowance. On Sunday, she made \$5 raking her neighbor's lawn. She gave the \$5 to her sister. Does she owe her sister more money? If so, how much?

## PERFORMANCE TASKS

### SCORING KEY

1. Work with a partner. Play Integer Sum BINGO. (See game board and directions. DO NOT SCORE

Complete the remaining tasks on your own.

2. Did you win at BINGO? DO NOT SCORE

3. What was your strategy? Explain.

2 POINTS - Tried to come up with sums that were in a row and tried to keep opponent from getting a needed sum

1 POINT - Tried to come up with sums in a row OR tried to keep opponent from getting a needed sum

0 POINTS - Could not explain strategy

4. Find the sum of each.

a.  $-4 + -8 = -12$  (1 POINT)

b.  $-12 + 6 = -6$  (1 POINT)

c.  $17 + -9 = 8$  (1 POINT)

d.  $-13 + 13 = 0$  (1 POINT)

5. Look at the following problem.

$$26 + -17 + -11 + 17 + -26 =$$

Without computing the sum, give the answer. -11 (1 POINT)

6. Find two temperatures that are 24 degrees apart and one of the numbers is less than zero. \_\_\_\_\_ and \_\_\_\_\_ ANSWERS VARY (1 POINT)

SAMPLES -1 & 23, -2 & 22, -3 & 21 ...

7. Using "O" for each negative number and "X" for each positive number, draw a picture to represent the sum of negative three. ANSWERS VARY (1 POINT)

SAMPLE ANSWERS : XXX + OOOOOO = OOO, XXXXX + OOOOOOOO = OOO

8. Lynn owes her sister \$12. On Saturday, she got her allowance of \$15. She spent \$8 on snacks at the game. She then gave her sister the rest of her allowance. On Sunday, she made \$5 raking her neighbor's lawn. She gave the \$5 to her sister. Does she owe her sister more money? If so, how much? NO, SHE DOES NOT OWE HER SISTER ANYTHING. (1 POINT)

William Shakespeare: Verbal/Linguistic

## Task Performance Worksheet

Materials: Paper, Pencil

Directions: Write a poem reflecting on the rules for addition of integers.



## Scoring Rubric

# of points	Explanation
4	<ul style="list-style-type: none"><li>* Poem is clearly developed, complete and contains accurate rules for addition of integers</li><li>* Communicates effectively to audience with strong argument supporting the rules for addition of integers</li><li>* Shows understanding of the rules for and the processes of addition of integers</li></ul>
3	<ul style="list-style-type: none"><li>* Poem response is clear, fairly complete and contains accurate use of rules for addition of integers</li><li>* Communicates effectively to audience</li><li>* Shows general understanding of the rules for addition of integers</li></ul>
2	<ul style="list-style-type: none"><li>* Poem response is partially developed but explanation may be muddled</li><li>* Attempts to communicate effectively with audience</li><li>* Lacks full understanding of concept</li><li>* Ideas show little or no elaboration</li></ul>
1	<ul style="list-style-type: none"><li>* Poem is attempted but incomplete</li><li>* Communication misuses or omits math concepts</li><li>* Shows little understanding and may include major errors</li><li>* Ideas are weak and may misrepresent addition of integers</li></ul>
0	<ul style="list-style-type: none"><li>* Blank</li><li>* Unable to begin poem</li><li>* Attempts wrong task</li><li>* Illegible, non-readable, or non-decipherable</li></ul>

## Performance Task Worksheet

The Cycle Club took a bike trip from Baltimore to Ocean City. The trip passed through the towns in the following order:

Baltimore  
Glen Burnie  
Severna Park  
Sandy Point  
Grasonville  
Wye Mills  
Easton  
Hurlock  
Salisbury  
Ocean City

1. Solve the following equations to determine the points to be graphed on the coordinate grid.

Solve the equations and express the solutions as ordered pairs.

1.  $x = -7 + -9$        $y = 6 + 4$       (    ,    )

2.  $x = -10 + 3$        $y = 14 + -16$       (    ,    )

3.  $x = -3 + -11$        $y = 27 + -23$       (    ,    )

4.  $x = 15 + -28$        $y = 17 + -15$       (    ,    )

5.  $x = -2 + 19$        $y = -16 + -7$       (    ,    )

6.  $x = 27 + -22$        $y = -27 + 5$       (    ,    )

7.  $x = -7 + -5$        $y = 35 + -37$       (    ,    )

8.  $x = 16 + -20$        $y = 25 + -28$       (    ,    )

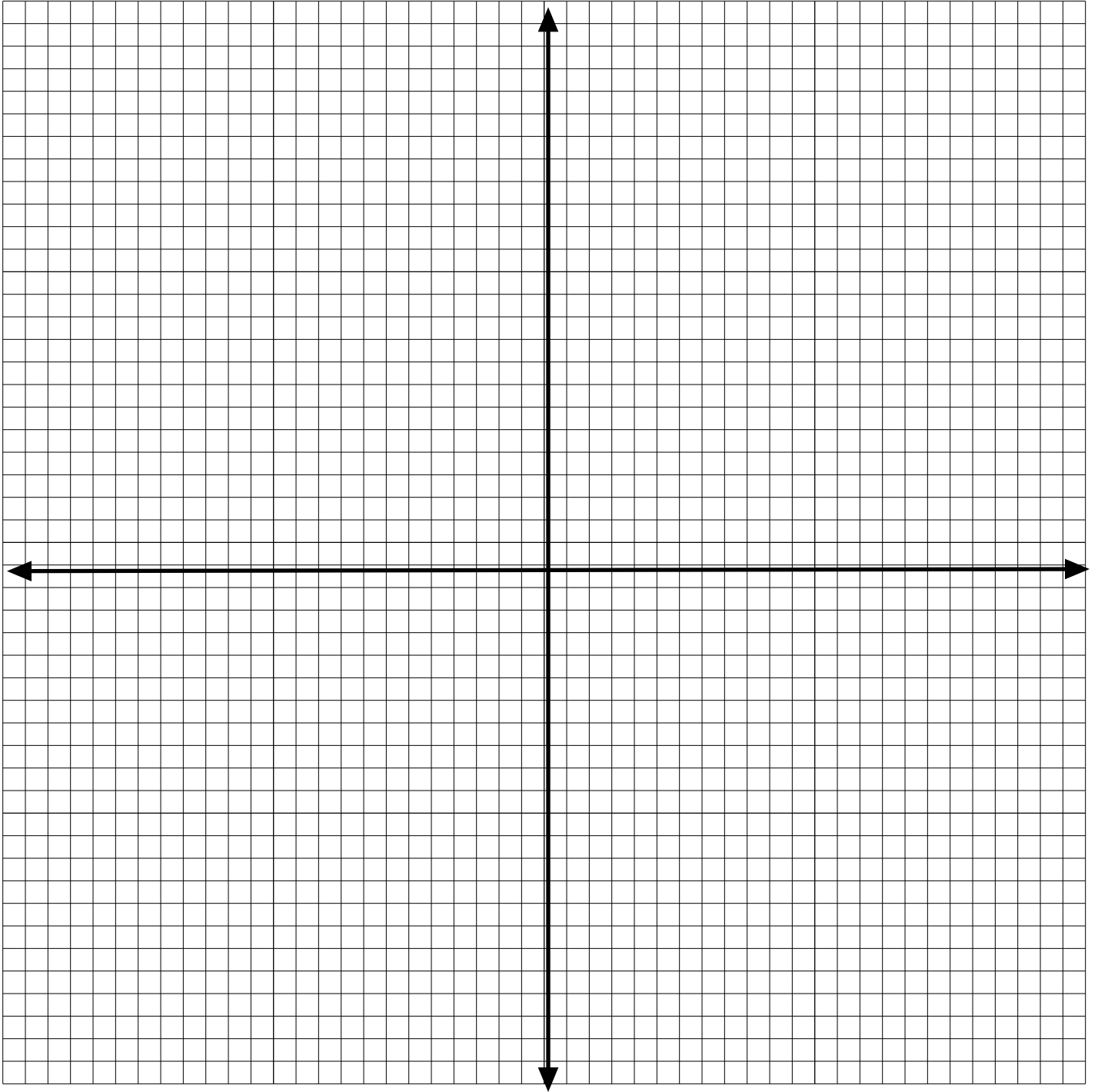
9.  $x = -2 + -1$        $y = -7 + -5$       (    ,    )

10.  $x = 17 + -14$        $y = -44 + 28$       (    ,    )

Pablo Picasso: Visual/Spatial

2. Graph each of the points.
3. Label each point with the name of the town in order listed above.
4. Connect the points in order to show a map of their route.

## Bike Club's Trip Route



## Performance Task Worksheet - ANSWERS

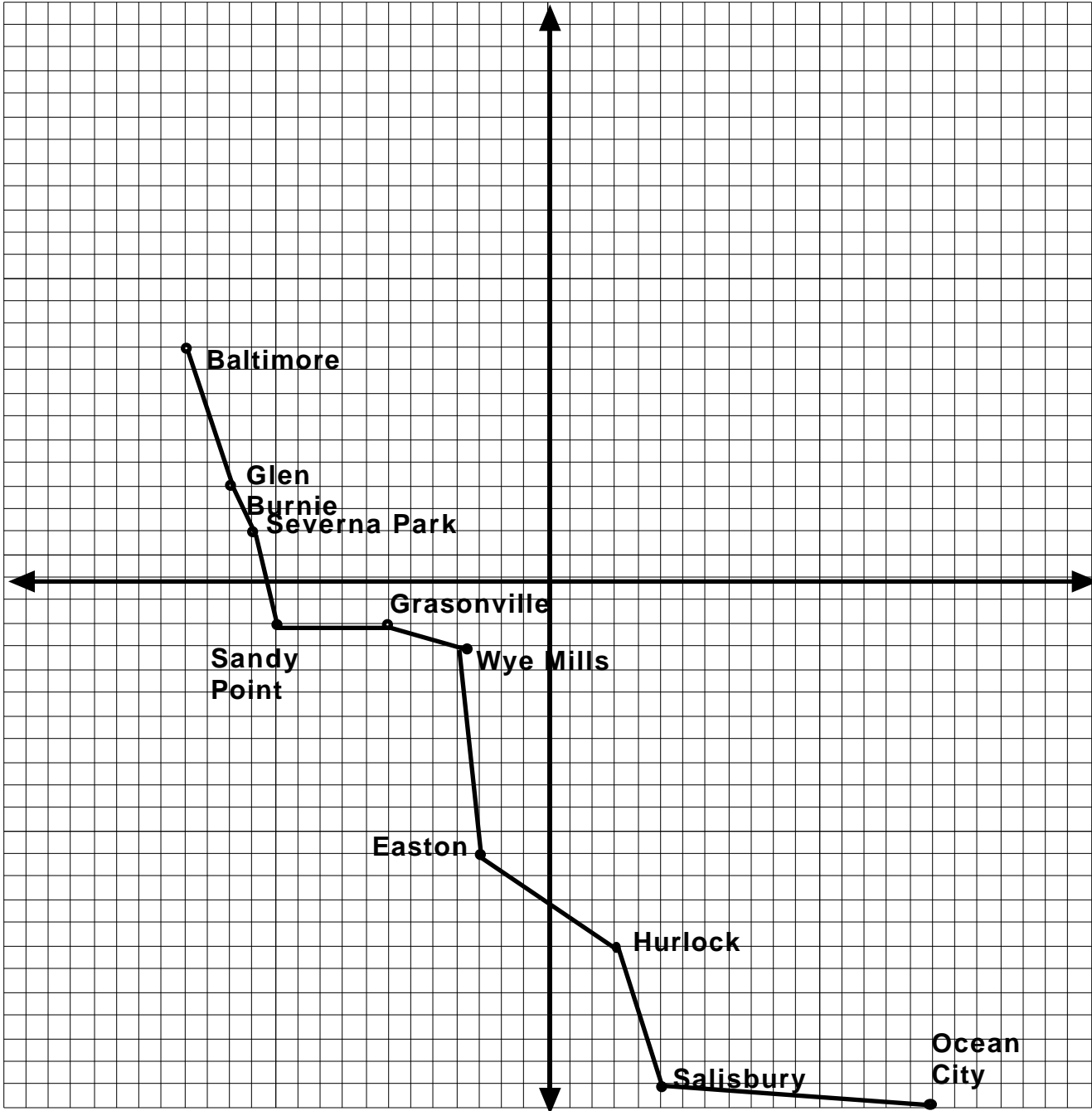
The Cycle Club took a bike trip from Baltimore to Ocean City. The trip passed through the towns in the following order:

Baltimore  
Glen Burnie  
Severna Park  
Sandy Point  
Grasonville  
Wye Mills  
Easton  
Hurlock  
Salisbury  
Ocean City

Solved equations:

1.  $x = -7 + -9$      $y = 6 + 4$      $( -16 , 10 )$     Baltimore
2.  $x = -10 + 3$      $y = 14 + -16$      $( -7 , -2 )$     Grasonville
3.  $x = -3 + -11$      $y = 27 + -23$      $( -14 , 4 )$     Glen Burnie
4.  $x = 15 + -28$      $y = 17 + -15$      $( -13 , 2 )$     Severna Park
5.  $x = -2 + 19$      $y = -16 + -7$      $( 17 , -23 )$     Ocean City
6.  $x = 27 + -22$      $y = -27 + 5$      $( 5 , -22 )$     Salisbury
7.  $x = -7 + -5$      $y = 35 + -37$      $( -12 , -2 )$     Sandy Point
8.  $x = 16 + -20$      $y = 25 + -28$      $( -4 , -3 )$     Wye Mills
9.  $x = -2 + -1$      $y = -7 + -5$      $( -3 , -12 )$     Easton
10.  $x = 17 + -14$      $y = -44 + 28$      $( 3 , -16 )$     Hurlock

Bike Club’s Trip Route (Key)



## BIKE TRIP SCORING KEY

### PART 1 - SOLVING EQUATIONS

1 point for each correct sum - total of 20 points

0 points for each incorrect sum

EVEN IF SUMS ARE INCORRECT, IF THE ORDERED PAIR IS GRAPHED CORRECTLY, AWARD POINTS.

### PART 2 - GRAPHING ORDERED PAIRS

1 point for each correctly graphed ordered pair - total of 10 points

0 points for each incorrectly graphed ordered pair

### PART 3 - LABELING POINTS

1 point for each correctly labeled point - total of 10 points

0 points for each incorrectly labeled points

### SCORING KEY SCALE:

4 : 40 - 35 points

3 : 34 - 25 points

2 : 24 - 15 points

1 : 14 - 5 points

0 : < 5 points

## Rocks Across the River

### PERFORMANCE TASKS

You will need the following materials

18 "rocks" numbered -9 to +9 (excluding 0),  
index cards numbered -18, -16, -14, -12, -10, -7, -6, -5, -4,  
-3, -1, 1, 4, 5, 7, 8, 10, 12, 14, -8, 3,  
-2, 6, 16

paper

pencils

blue runner for the river or a starting line and finishing line

1 performance task worksheet for each group

1. Work with a partner or small group to play the "Rocks Across the River" game. (Those who are unsuccessful will be ALLIGATOR LUNCH!)
2. Object of the game: Select at least six rocks that add up to their chosen sum.
  - a. Choose a card which will determine the value of the sum of the rocks.
  - b. Choose a "rock" numbered from -9 to +9 (excluding 0) and in the "river" (floor).
  - c. Continue choosing rocks, placing one at a time in the river until they reach their chosen sum using at least 6 rocks and cross the river.  
Remember to be creative  
(6 IS THE MINIMUM).
  - d. Pick -up a performance task on the other side of the river and record your results.
  - e. Return rocks to original shore.
  - f. Everyone in the group should repeat the exercise using the original sum but different solutions.
  - g. If time permits, choose another card and repeat the game.

# PERFORMANCE TASK

<u>NAME</u>	<u>ROCKS CHOSEN</u>	<u>SUM</u>
_____	____+____+____+____+____+____+____+____+____+____+____	_____
_____	____+____+____+____+____+____+____+____+____+____+____	_____
_____	____+____+____+____+____+____+____+____+____+____+____	_____
_____	____+____+____+____+____+____+____+____+____+____+____	_____
_____	____+____+____+____+____+____+____+____+____+____+____	_____
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_____	____+____+____+____+____+____+____+____+____+____+____	_____

Scoring Key

1 point for each correct answer  
0 points for an incorrect answer



## WORKSHEET 1 - Rock Pattern

**TEACHER NOTE:** You will need the following materials

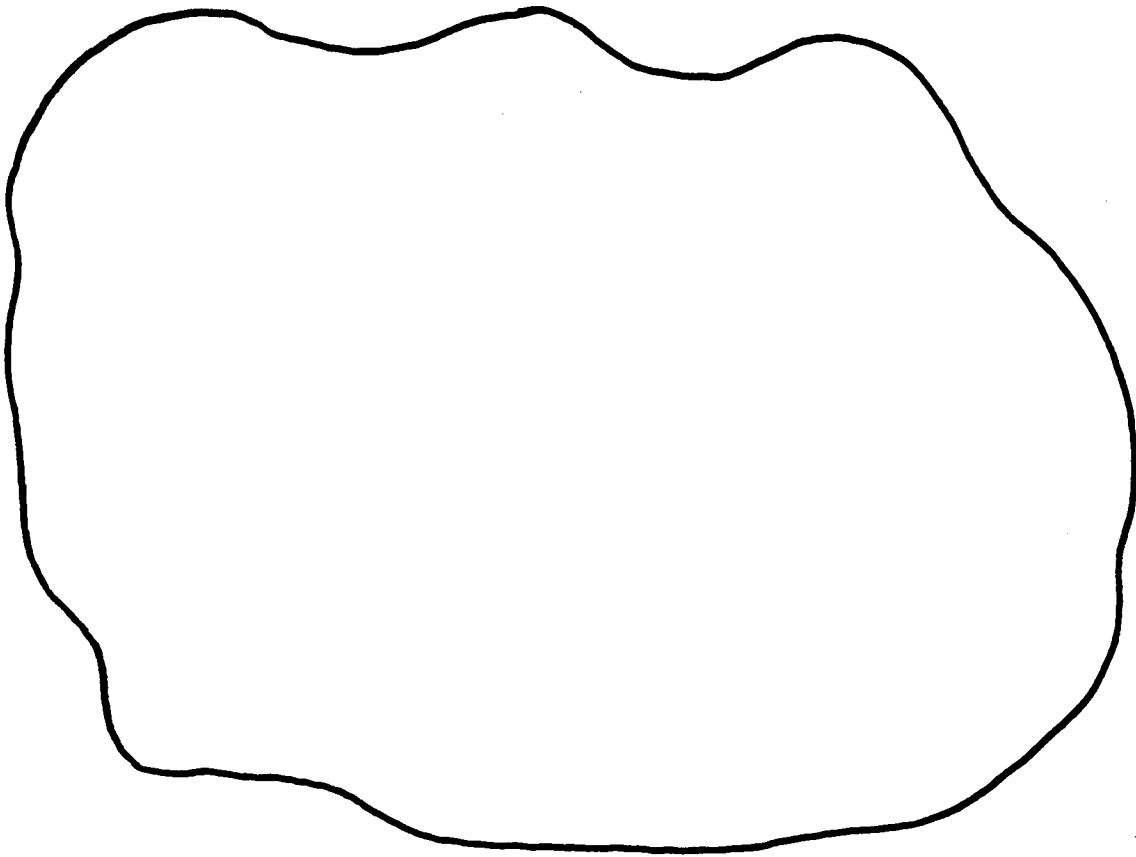
18 "rocks" numbered -9 to +9 (excluding 0),  
index cards numbered -18, -16, -14, -12, -10, -7, -6, -5, -4,  
-3, -1, 1, 4, 5, 7, 8, 10, 12, 14, -8, 3,  
-2, 6, 16

paper

pencils

blue runner for the river or a starting line and finishing line

1 performance task worksheet for each group



Ray Charles: Musical/Rhythmic

## Ray Charles

Materials: Paper, Pencil

Directions: Using the rules for adding integers, write a rap song or write lyrics to a song to the tune of "Mary Had a Little Lamb" or a tune of your choice.

## Scoring Rubric

# of points	Explanation
4	<ul style="list-style-type: none"><li>* Song is clearly developed, complete and contains accurate rules for addition of integers</li><li>* Communicates effectively to audience with strong argument supporting the rules for addition of integers</li><li>* Shows understanding of the rules for and the processes of addition of integers</li></ul>
3	<ul style="list-style-type: none"><li>* Song response is clear, fairly complete and contains accurate use of rules for addition of integers</li><li>* Communicates effectively to audience</li><li>* Shows general understanding of the rules for addition of integers</li></ul>
2	<ul style="list-style-type: none"><li>* Song response is partially developed but explanation may be muddled</li><li>* Attempts to communicate effectively with audience</li><li>* Lacks full understanding of concept</li><li>* Ideas show little or no elaboration</li></ul>
1	<ul style="list-style-type: none"><li>* Song is attempted but incomplete</li><li>* Communication misuses or omits math concepts</li><li>* Shows little understanding and may include major errors</li><li>* Ideas are weak and may misrepresent addition of integers</li></ul>
0	<ul style="list-style-type: none"><li>* Blank</li><li>* Unable to begin song</li><li>* Attempts wrong task</li><li>* Illegible, non-readable, or non-decipherable</li></ul>

## Performance Task Worksheet

Materials: Scissors, tape, 2 cube patterns, paper and pencil.

Directions: As a group, use the materials provided to create a mathematical game that uses two game cubes and involves the rules for addition of integers.

- Together,
- (1) assemble cube,
  - (2) brainstorm about how you could create a game,
  - (3) write directions to the game,
  - (4) play a simulated game to see if it really works, and modify directions, if necessary.

Mother Teresa -  
Interpersonal  
Cube Pattern


## Scoring Rubric

# of points	Explanation
4	<ul style="list-style-type: none"><li>* Game is clearly developed, complete and contains accurate rules for addition of integers</li><li>* Communicates effectively to audience with strong argument supporting the rules for addition of integers</li><li>* Shows understanding of the rules for and the processes of addition of integers</li></ul>
3	<ul style="list-style-type: none"><li>* Game directions are clear, fairly complete and contains accurate use of rules for addition of integers</li><li>* Communicates effectively to audience</li><li>* Shows general understanding of the rules for addition of integers</li></ul>
2	<ul style="list-style-type: none"><li>* Game directions are partially developed but explanation may be muddled</li><li>* Attempts to communicate effectively with audience</li><li>* Lacks full understanding of concept</li><li>* Ideas show little or no elaboration</li></ul>
1	<ul style="list-style-type: none"><li>* Game is attempted but incomplete</li><li>* Communication misuses or omits math concepts</li><li>* Shows little understanding and may include major errors</li><li>* Ideas are weak and may misrepresent addition of integers</li></ul>
0	<ul style="list-style-type: none"><li>* Blank</li><li>* Unable to begin game</li><li>* Attempts wrong task</li><li>* Illegible, non-readable, or non-decipherable</li></ul>

## Performance Task Worksheet

Materials: Paper, Pencil

Directions: Your task is to write a journal entry concerning the rules for addition of integers.

Before you begin writing think about the following:  
What are the rules for addition of integers?

What kind of examples could you include?

What definitions should you include?

Are there real-life experiences that you could include?

## Scoring Rubric

# of points	Explanation
4	<ul style="list-style-type: none"><li>* Journal is clearly developed, complete and contains accurate rules for addition of integers</li><li>* Communicates effectively to audience with strong argument supporting the rules for addition of integers</li><li>* Shows understanding of the rules for and the processes of addition of integers</li></ul>
3	<ul style="list-style-type: none"><li>* Journal response is clear, fairly complete and contains accurate use of rules for addition of integers</li><li>* Communicates effectively to audience</li><li>* Shows general understanding of the rules for addition of integers</li></ul>
2	<ul style="list-style-type: none"><li>* Journal response is partially developed but explanation may be muddled</li><li>* Attempts to communicate effectively with audience</li><li>* Lacks full understanding of concept</li><li>* Ideas show little or no elaboration</li></ul>
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0	<ul style="list-style-type: none"><li>* Blank</li><li>* Unable to begin journal</li><li>* Attempts wrong task</li><li>* Illegible, non-readable, or non-decipherable</li></ul>



# GARDNER'S SEVEN INTELLIGENCE STATIONS

## STUDENT EVALUATION

- 1) In which of Howard Gardener's 7 Intelligences do you believe you excel ? Why?
- 2) Which station did you enjoy the most? Why?
- 3) Which station did you not enjoy? Why?
- 4) Would you recommend that these activities be used with other students? Why?